

Realtime Controller Specifications for SLR2000

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Operating System

The Operating System for the main SLR2000 system controllers (POP & DAN) must have the following characteristics:

- ▶ True realtime kernel with a latency on order of tens of microseconds, and which is POSIX compliant.
- ▶ Ability to reduce kernel services in order to achieve a small kernel (reducing both memory occupation and amount of CPU time taken up by kernel tasks).
- ▶ Good development environment with “C” compiler and robust tool set.
- ▶ Ability of operating system to provide a Windows GUI environment.
- ▶ Portability between various computer manufacturers and configurations.
- ▶ Availability of device drivers and demonstrated ability of company to continue to develop drivers for new hardware interfaces.
- ▶ Demonstrated viability of the company and good service/support record.

Other desired characteristics are:

- ▶ UNIX like operating system and ability to run UNIX programs on the system.
- ▶ X-Windows and MOTIF available.
- ▶ Reasonable cost of development and runtime packages.

The Operating System for the data collection computer (ICC) must have the following characteristics:

- ▶ Low OS overhead.
- ▶ Ability of OS to support the off the shelf devices required for SLR2000.
- ▶ Low cost.
- ▶ Be familiar to current software team members (to minimize development time).

The Operating System for the remote terminal (RAT) must have the following characteristics:

- X-Windows and Motif support (for porting existing software)..
- UNIX like operating system (for porting existing software)
- Ability to run on a laptop..

Chosen OS for SLR2000:

LynxOS for the main system controllers (POP and DAN).

LINUX for RAT.

DOS for ICC.

Computer hardware

The hardware has to be flexible enough to handle multiple backplanes since most of the hardware interfaces have not yet been chosen. The hardware selected must also support the chosen Operating System. The hardware must also allow the software to perform the following tasks:

- handle the 2000 laser fires and range returns per second,
- process this data and make the decisions currently made by a human operator,
- record the data to hard disk,
- analyze the data, format it and to send it out via the internet every few hours,
- keep track of the system's health and safety and act if problems occur,
- analyze the system performance and determine when performance is degrading.

Chosen hardware setup for SLR2000:

There will be five processors used:

- Interface Control Computer (ICC) which will do all of the realtime data collection. This computer will be a Pentium processor with both an ISA and a PCI backplane.
- Pseudo-Operator (POP) will interface with the ICC at 2kHz and will make most of the decisions currently made by a human operator. This processor will be a Pentium in a VME module. This computer will interface with the ICC and DAN via a Bit-3 shared memory device.
- Data Analysis Computer (DAN) will perform the health and safety monitoring, analyze

and process the data, and communicate via internet with the external world.

- ▶ The Remote Access Terminal (RAT) will be used as a tool for the software development team to debug the software, and by the system maintenance personnel who will need to communicate with the system. RAT will be a Pentium laptop which will provide User displays and will allow the operating to communicate with and control the SLR2000 system.
- ▶ The Dome Control System (DCS) is the micro controller that controls the locating of the dome slit and the opening / closing of the dome shutter.